

REMARKS

In view of the above amendments and the following remarks, reconsideration of the rejections contained in the Office Action of October 18, 2004 is respectfully requested.

On page 1 of the Office Action, the Examiner indicated that claims 1-1~~4~~ are presently pending this application. However, the Examiner is requested to note that claims 1-1~~5~~ were original presented and pending in this application. In this regard, the Examiner appears to have considered all 15 originally-pending claims in view of the rejections set forth on pages 2-6 of the Office Action, and so the Applicants assume that the indication on page 1 of the Office Action is merely a typographical error.

On page 2 of the Office Action, the Examiner rejected originally-pending claims 1-15 under 35 U.S.C. § 112, second paragraph as being indefinite. In particular, the Examiner asserted that the phases “by a flip-chip mounting process,” “plastic treatment,” and “machining” are vague and indefinite because it is not clear what actions are actually being performed in these steps.

In view of the following remarks, the Examiner is requested to reconsider the formal rejections under § 112. Firstly, the Examiner is requested to note that several of the original claims have been amended as indicated above to address the formal rejections. In particular, the phrase “plastic treatment” has been replaced with the phrase “plastically deforming,” which has a clearly understood meaning in the art as described in paragraph [0079] on page 13 of the specification. In addition, the term “machining” has been replaced with the term “cutting” for clarification. In addition, the Applicants respectfully traverse the Examiner’s assertion that the phrase “flip-chip mounting” is vague. In contrast to the Examiner’s position, it is submitted that the phrase “flip-chip mounting” is commonly used in this field of art, and is well-known to one of ordinary skill in the art to mean that a surface of a semiconductor element on which electrodes are formed is mounted so as to face electrodes or a wiring pattern formed on a surface of a base member, intermediate member, or a circuit board. Because the phrase “flip-chip mounting” has a clearly understood meaning within the art, the Examiner is respectfully requested to withdraw the

rejection under §112 based on this phrase. Moreover, in view of the above, it is respectfully submitted that all of the Examiner's rejections under § 112 have been overcome.

The Examiner rejected claims 1, 2, 4, 8, 9, 12, and 13 under 35 U.S.C. § 102(b) as being anticipated by the Brown reference (USP 4,616,406); rejected claims 1-3 and 12 as being anticipated by the Dotani reference (JP Publication 04-240759); rejected claims 5 and 15 as being unpatentable over either the Brown reference or the Dotani reference in view of the Furukawa reference (JP Publication 61-237458); rejected claim 6 as being unpatentable over the Brown reference or the Dotani reference in view of the Welch reference (USP 5,165,651); and rejected claim 14 as being unpatentable over the Brown reference or the Dotani reference in view of the Lee reference (USP 4,778,950). In item 10 on page 6 of the Office Action, however, the Examiner indicated that dependent claims 7, 10, and 11 contain allowable subject matter. In view of the Examiner's treatment of the original claims, the claims have now been amended as indicated above. For the reasons discussed below, it is respectfully submitted that the amended claims are clearly patentable over the prior art of record.

As an initial matter, the Examiner is requested to note that allowable dependent claim 7 has now been amended so as to be placed in independent form including all of the subject matter of original base independent claim 1 and intervening claim 6, while original allowable dependent claim 10 has now been amended so as to be placed in independent form including all of the subject matter of original base independent claim 1 and intervening claim 9. Therefore, in view of the Examiner's indication of allowable subject matter, it is respectfully submitted that amended independent claims 7 and 10, and the claims that dependent therefrom, are clearly patentable over the prior art of record.

Claim 2 has now been amended so as to be placed in independent form including the subject matter of original base independent claim 1, and the Examiner's prior art rejection of claim 2 is respectfully traversed. in this regard, amended independent claim 2 clearly recites forming a *wiring pattern* on the semiconductor element-mounting face of the base member *and* on the circuit board-mounting face of the base member so that the wiring pattern is electrically connected to each end of *each* of the conductive members. As a result, the base member can

serve as intermediate member when the semiconductor element is mounted to the wiring pattern formed on the semiconductor element-mounting face and when the circuit board-mounting face of the base member is mounted to a circuit board. Furthermore, forming the wiring pattern on the respective faces of the base member provides flexibility in that the wiring pattern can be easily modified so as to adapt to difference types of semiconductor elements and/or circuit boards, and there is no need to modify the semiconductor elements or the circuit boards to adapt them to the base member.

The Brown reference is directed to a process of making a semiconductor device in which leads 14 are embedded within plastic material 12 of a package 2. In various embodiments illustrated in figures 3 and 4 of the Brown reference, a die 10 is connected to one end of the leads 14. Assuming, for the sake of argument, that the die 10 constitutes a wiring pattern, the Brown reference still does not disclose or suggest forming a wiring pattern on *both* a semiconductor element-mounting face of the base member *and* a circuit-mounting face of the base member which is opposite the semiconductor element-mounting face. Therefore, it is submitted that the Brown reference does not anticipate or even suggest amended independent claim 2.

The Dotani reference discloses a method of manufacturing a pin structure in which pins 1 extend through an organic resin film 11. The ends of each of the pins are coated with a metal material 13 to improve a connection between the pins and an electronic device. However, the metal material coating on the ends of each of the pins does not constitutes a *wiring pattern* as recited in amended independent claim 2. Moreover, the Dotani reference does not disclose or even suggest forming a *wiring pattern* on a semiconductor element-mounting face and on a circuit board-mounting face of a base member as recited in amended independent claim 2. Therefore, it is respectfully submitted that the Dotani reference also does not anticipate or even suggest the invention recited in amended independent claim 2.

The Lee reference, the Welch reference, and the Furukawa reference also do not, either alone or in combination, disclose or suggest forming a *wiring pattern* on *both* of a semiconductor element-mounting face of a base member *and* a circuit board-mounting face of the base member as recited in amended independent claim 2. Therefore, one of ordinary skill in the art would not

be motivated by these references to modify the Brown reference or the Dotani reference so as to obtain the invention recited in amended independent claim 2. Accordingly, it is respectfully submitted that amended independent claim 2 and the claims that depend therefrom are clearly patentable over the prior art of record.

Claim 6 has now been amended so as to be placed in independent form including all of the subject matter of original base independent claim 1, and so as to slightly clarify the relationship of the injection openings and the conductive members. In particular, amended independent claim 6 now recites that the method comprises injecting resin material in an axial direction parallel to the longitudinal axes of the conductive members through at least two injection openings that are arranged symmetrically *around each of the conductive members*.

For the Examiner's benefit, amended independent claim 6 will now be described with reference to figure 14 of the present application. However, reference to figure 14 is made only to aid in the Examiner's understanding of the invention by illustrating one particular embodiment of the invention recited in amended claim 6, and reference to 14 is not intended to otherwise limit the scope of the claims. Figure 14 is a plain view of a mold used to manufacture a semiconductor element-mounting board using the method recited in amended independent claim 6, and illustrates the conductive members 103 and the injection openings 110. As explained in paragraph [0105] of the specification, because the resin material is injected through the injection openings *arranged symmetrically around each of the conductive members*, any influences upon the conductive members by the resin material during the injection process is significantly minimized or eliminated. In other words, as illustrated in figure 14, each of the conductive members 103 has injection openings arranged symmetrically around it so as to be located at a twelve o'clock position, a three o'clock position, a six o'clock position, and a nine o'clock position. As a result, any force applied from the resin material against the conductive members 103 during the injection process will be cancel out by an opposing force due to the symmetrical arrangement of the injection openings. Consequently, the conductive members will not be inadvertently moved or shifted within the mold during the injection process.

The Examiner acknowledged that the Brown reference and the Dotani reference do not disclose injecting resin material in an axial direction parallel to the longitudinal direction of the conductive members. Nonetheless, the Examiner asserted that the Welch reference discloses injecting a resin material 50 in an axial direction parallel to the longitudinal direction of a conductive member 32V/34 through two symmetrical injection openings. However, for the reasons discussed below, it is respectfully submitted that the Welch reference would not motivate one of ordinary skill in the art to modify the Brown reference or the Dotani reference so as to obtain the invention recited in amended independent claim 6.

As an initial matter, as explained above, amended independent claim 6 now recites that the resin material is injected through at least two injection openings *arranged symmetrically around each of the conductive members*. In contrast, the Welch reference teaches that two openings 20, 20 are formed in a horizontal wall 16 of a hollow form 10, and that the hollow form 10 is attached to a slab 40 by reinforcement rods 32V, 32 and bolts 38. In this regard, the Examiner asserted that the reinforcement rods 32V correspond to the conductive members of the present invention, and that resin material 50 is injected through the “symmetrical” injection openings 20 in an axial direction parallel to longitudinal direction of the “conductive members” 32V. However, the Welch reference does not disclose or even suggest that the reinforcement rods 32V are *conductive*. In fact, because the reinforcement rods 32V merely serve to anchor the form 10 to the slab 40, the reinforcement rods 32V can be formed of any non-conductive materials such as plastic or wood, so that there is not even a suggestion that the rods be made of a conductive material.

Moreover, although the openings 20, 20 are formed symmetrically with respect to the horizontal wall 16, the Welch reference does not disclose or even suggest openings that are arranged *symmetrically around each of the conductive members*. In this regard, there is an opening formed, for example, to the left of the right-most reinforcement rod 32V, but there is no opening formed to the *right* of that same reinforcement rod 32V so as to create a symmetrical arrangement of openings around that particular reinforcement rod.

Finally, the Applicants note that both the Brown reference and the Dotani reference are directed to boards in which conductive pins or leads are arranged so as to be connected to some type of a electronic device. The Welch reference, on the other hand, is directed to a method of preparing a machine foundation, in which a fortifying cement material 50 is poured into a hollow form 10 anchored to a slab 40. In other words, the subject matter of the Welch reference is not at all related to the subject matter of either the Brown reference or the Dotani reference. Therefore, because the Brown reference or the Dotani reference, and the Welch reference are non-analogous art, it is submitted that one of ordinary skill in the art would not be motivated to look to the Welch reference in an effort to modify the Brown reference or the Dotani reference. Furthermore, because the Lee reference and the Furukawa reference also do not disclose or suggest injecting resin material through at least two injection openings arranged symmetrically around each of the conductive members as recited in the amended independent claim 6, one of ordinary skill in the art would not be motivated to modify the Brown reference or the Dotani reference so as to obtain the invention recited in amended independent claim 6. Accordingly, it is respectfully submitted that amended independent claim 6 and the claims that depend therefrom are clearly patentable over the prior art of record.

Claim 13 has now been amended so as to be placed in independent form including all of the subject matter of original base independent claim 1, and so as to clarify the meaning of the term “machining.” In particular, claim 13 now recites that the method comprises *cutting* at least one of the semiconductor element-mounting face and the circuit board-mounting face of the base member after said injecting so as to divide the at least one face into a plurality of face sections. This step simplifies the manufacturing process by, for example, allowing the use of one large mold to form a large base member, and then cutting the large base member into smaller base members as required. As a result, it is not necessary to perform the steps of arranging the conductive members and injecting the insulating resin so as to form multiple smaller base members.

The Brown reference, the Dotani reference, the Furukawa reference, the Welch reference, and the Lee reference do not, either alone or in combination, disclose or even suggest cutting a

face so as to divide the face into a plurality of face sections, as recited in amended independent claim 13. Therefore, one of ordinary skill in the art would not be motivated to combine the references in a matter that would result in the invention recited in amended independent claim 13. Accordingly, it is respectfully submitted that amended independent claim 13 and the claims that depend therefrom are clearly patentable over the prior art of record.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance. However, if the Examiner should have any comments or suggestions to help speed the prosecution of this application, the Examiner is requested to contact the Applicant's undersigned representative

Respectfully submitted,

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